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SPECIAL OPERATIONS EXECUTIVE

(Extracted from the internet with comments added by Peter
R Jensen)

At an early part of the Second World War, at the behest of Winston Churchill, a new organization was created with the specific objective of "setting aflame" German occupied Europe: The Special Operations Executive (SOE).

SOE was to employ the talents of a variety of brave people who went to Europe to assist the local resistance organizations and many paid for it with their lives. Reaction by the Germans to local resistance activities tended to be very brutal and unforgiving.

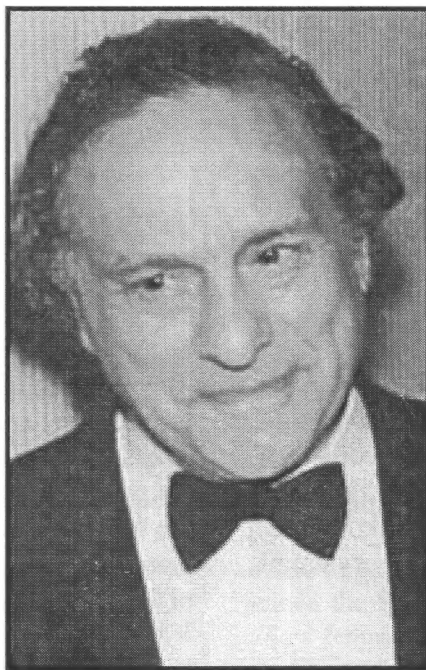
As a part of the SOE operation, communications and ciphers played a critical part. In this regard, two operators stand out. Leo Marks and Violette Szabo. In the following edited extracts from an Internet source, the careers of these two notable persons in the history of the Second World War are recounted

Leo Marks

Son of a Jewish bookseller, Leo Marks was born in London on 24th September, 1920 and joined the British Army in January 1942. Trained as a cryptographer he was assigned to the Special Operations Executive (SOE).

Marks became an expert in cryptanalysis (making and breaking codes and ciphers) and eventually became head of SOE's codes and ciphers with a staff of 400 people. It was Marks's responsibility to provide agents with the ciphers with which to send information to London by radio.

These ciphers were often based on famous poems or brief passages of memorable prose such as the Lord's Prayer. Marks argued that the enemy might know the poem or the prose passage and would then be able to break the cipher. To overcome this problem Marks provided unknown poems for his agents. This included the poem *The Life That I Have*, that had originally been written for his girlfriend, Ruth Hambro who had been killed in an air crash in Canada. He later gave the poem as a cipher to the SOE agent Violette Szabo when she was sent to France during the war.



Leo Marks

When agents based in Holland began sending messages without any errors, Marks suspected they had been arrested by the Gestapo. To test his theory he sent indecipherable messages to the agents. When they did not complain he knew that the short-wave morse transceivers were under the control of the Germans. His warnings were ignored by Maurice Buckmaster and agents continued to be sent to Holland where they were arrested and in most cases executed.

On 23rd June, 1943, three key members of the Prosper Network, Andree Borrel, Francis Suttill and Gilbert Norman, were arrested by the Gestapo. Noor Inayat Khan reported

back to the Special Operations Executive that she had lost contact with the rest of the group and feared they were in the hands of the Germans. Jack Agazarian, who was on leave at the time, told the SOE that if this was the case, he suspected that they had been betrayed by Henri Dericourt, a former pilot in the French Air Force,

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Violette Szabo

MORSE CODE GETS @ FOR ACTIVE

Mark Glassman / New York Times

The French say petit escargot; the Dutch call it a monkey's tail. On a qwerty keyboard, it's Shift-2. And next month, amateur radio enthusiasts will call it dit-dah-dah-dit-dah-dit. That is when the symbol @ officially becomes the newest character in the Morse code.

"As far as we know, this is the first change to the code in at least 60 years," said Gary Fowlie, a spokesman for the International Telecommunication Union, the arm of the United Nations that will oversee the update, which is to become official on May 3. "There is a need for it." But with the rise of email, Morse code must reckon with the @ symbol, which is essential to every email address.

Ham radio hobbyists used Morse code to exchange email addresses on the air so that they could trade files or lengthy web addresses, said Rick Lindquist, the senior news editor at the American Radio Relay League, the largest association of amateur radio enthusiasts in the US. "Most of our members have email capability," he said.

Until now, those ham operators had to spell out @ with two letters of code: A, a dot followed by a dash, and T, a dash. The resulting sound is "dit-dah-dah," which also translates to the letter W. Now the @ symbol is transmitted by combining the letters A and C and has a sound not shared by any other single character.

"The irony is that sending the word 'at' is shorter," Mr Lindquist said. The word 'at' takes nine beats, or dots; the @ symbol takes 17. How radio hobbyists respond to that difference will determine the popularity of the symbol over the word. So far the word appears to be winning. "I think they designed it wrong," said Herb Sweet, the treasurer of an amateur radio club in Poughkeepsie, New York state. "I have a hunch that people are more than likely to just go A-T - dit-dah-dah."

Many Morse code users learn punctuation to earn their radio licences but ignore it later, during actual communication.

SOE - CONT

whose job it was to find suitable landing grounds and organize receptions for agents brought by air.

Gilbert Norman continued to send messages to London. Marks, was convinced that Norman was under the control of the Gestapo. Major Nicholas Bodington disagreed and persuaded Maurice Buckmaster to let him go to France to find out what had happened. Jack Agazarian was recalled from leave and the two men were taken to France.

Messages from the wireless owned by Gilbert Norman were still being sent to the Special Operations Executive in London. Instructions were passed on to Bodington by the SOE to arrange a meeting with Norman at the address he had sent them. Bodington later claimed that he and Jack Agazarian tossed to decide who should visit the address. Agazarian, who was convinced it was a trap, lost, and when he arrived at the address he was immediately arrested. Agazarian was tortured by the Gestapo for six months at Fresnes Prison before being sent to Flossenburg where he was kept in solitary confinement.

After the war Marks became a writer for stage and screen. This included writing the script for *Peeping Tom*. Directed by Michael Powell in 1960 it tells the story of a serial killer who films young women as he stabs them to death. Condemned as pornographic and evil, it was not shown on television until 1997.

Marks also had trouble with his autobiography *Between Silk and Cyanide*, that challenged the official history of the Special Operations Executive written by M.R.D. Foot. Although written in the early 1980s it was blocked by Whitehall and only appeared in 1998. He also published *The Life That I Have* in 1999. Leo Marks died on 15th January 2001.

THE POEM

The poem Leo Marks had written for his girlfriend, Ruth Hambro, who was killed in an air crash in Canada

and later used as the basis of a cipher to be used by Violette Szabo, is as follows:

The life that I have is all that I have
And the life that I have is yours
The love that I have of the life that I have
Is yours and yours and yours.

A sleep I shall have, a rest I shall have
And death will be but a pause
For the years I shall have in the long green grass
Are yours and yours and yours.

VIOLETTE SZABO



Violette and husband Etienne

Daughter of an English father and a French mother, Violette Szabo was born in France on 26th June, 1921. She spent her early childhood in Paris where her father drove a taxi. Later the family moved to London and she was educated at a Brixton Secondary School. At the age of fourteen Violette left school and became a hairdresser's assistant. Later she found work as a sales assistant at Woolworths in Oxford Street.

During the Second World War Violette met Etienne Szabo, an officer in the Free French Army. The couple decided to get married (21st August 1940) when they discovered that Etienne was about to be sent to fight in North Africa.

Soon after giving birth to a daughter, Tania Szabo, Violette heard that her husband had been killed at El Alamein. She now developed a strong desire to get involved in the war effort and eventually joined the Special Operations Executive (SOE). She told a fellow recruit: "My husband has been killed by the Germans and I'm going to get my own back."

At first SOE officers had doubts about whether Violette should be sent to France. One officer wrote: "She speaks French with an English accent. Has no initiative; is completely lost when on her own. Another officer argued: "This student is temperamentally unsuitable... When operating in the field she might endanger the lives of others."

SOE - CONT

Colonel Maurice Buckmaster, head of SOE's French operations, overruled these objections and after completing her training Violette was parachuted into France where she had the task of obtaining information about the resistance possibilities in the Rouen area. Despite being arrested by the French police she completed her mission successfully and after being in occupied territory for six weeks she returned to England.

Violette returned to France in June 1944 but while with Jacques Dufour, a member of the French Resistance, was ambushed by a German patrol. By providing covering fire Szabo enabled Dufour to escape. Szabo was captured and taken to Limoges and then to Paris. After

being tortured by the Gestapo she was sent to Ravensbrück Concentration Camp in Germany.

Some time in the spring of 1945, with Allied troops closing in on Nazi Germany, Violette Szabo was executed. She was posthumously awarded the Croix de Guerre and the George Cross. Her story is told in the book and film entitled *Carve Her Name With Pride*.

THE VIOLETTE SZABO VIRTUAL MUSEUM ON THE INTERNET IS INTERESTING TOO – FIND IT AT :[www. Violette-szabo-museum.co.uk/](http://www.Violette-szabo-museum.co.uk/) (Editor)

ZOGGING AND POPHAM PANELS

Air communications in 1934

Mayling Hargreaves

Not long ago I read a obituary of Air Chief Marshal Sir David Lee in the UK Daily Telegraph.

As a recently qualified RAF pilot he was posted to the North West Frontier Province in India (now Pakistan) in 1933. He wrote a book about his time there called "Never Stop the Engine When It's Hot". It is a very entertaining and informative book. I found it through the internet via www.abebooks.com. The only adverse comment I have is that it has no index.

The author flew Westland Wapitis and Hawker Harts. Both were single engined bi-planes carrying 2 people, the pilot and the air gunner. They had no radio. Radio would probably not have been much use in such an area where the planes flew between high mountains.

To communicate between planes in a flight the pilots 'zogged' one another. From the book: "Zogging was a useful – indeed the only - form of communication between two pilots and consisted of a form of Morse Code. A long downward sweep of the arm with fist clenched indicated dash, and short downward sweep from the elbow, a dot."

There was almost nothing on the Internet about 'zogging', using Google search engine, except <http://www.bharat-rakshak.com/IAF/History/1940s/Ratnagar01.html> which is about a pilot in the Indian Air Force in the 1930s who also went on to become a senior officer.

Communication between the military on the ground and RAF pilots was carried out using 'Popham Panels'. Again from the book: "It was a very simple but effective form of communications between ground and air. Each post had a large square patch of ground outline by whitewashed stones in a position close to the buildings which was easily visible from the air. White canvas strips of various shapes and sizes could laid out in this square in accordance with a code contained in a small handbook held by each post and carried by every pilot and air gunner. A post was this able to lay out simple messages such as: "I am under attack from the south," or 'I have two seriously injured men, send medical help.'

Having read the message the pilot circling above could only reply by writing out an answer on his knee pad, enclosing it in a message bag which was a small canvas envelop with a lead weight stitched into it and a long multi coloured canvas streamer attached. His air gunner could then drop this as close as possible to the Popham Panel. Each post was exercised in this way about once a month. No advance warning was given and the pilot was required to record the time taken for the garrison to display its first message. Time varied considerably but the average was about three to four minutes."

FIVE TIPS FOR INTERNET EXPLORER

From Micromart

For a freebie with Windows, Internet Explorer is not at all bad! Terry Freedman investigates some of its finer aspects.

First off, let's look at the Favorites section. No doubt you are already familiar with this, but just in case you're not, here's how it works. Whenever you come across a website that you think you would like to revisit at some point, just click on Favorites-Add to Favorites, and bob's your uncle: it will be listed under Favorites, so that in future all you have to do is find it and click on it.

If, like me, you are always in a hurry, you will just add to the Favorites section without thinking about organising it all as you go along. The result: the equivalent of a huge box in the middle of your living room floor into which you chuck every letter and other document that you want to keep. Well, that is certainly much faster than storing letters and papers in different drawers, but it does have the slight disadvantage that finding a particular letter when you need it will take an age.

Exactly the same thing applies to the Favorites menu. In fact, you'll know when it's time to get organised when it starts to take you longer to find a particular website in your Favorites list than it would take you to search for it again from scratch!

There is a better way!

The ideal approach is to organise as you go along. That means that, instead of selecting Favorites-Add to Favorites-OK, select Favorites-Add to Favorites-Create in or, if there is not a suitable folder already there, New folder.

If you haven't managed to get your act together to do that, there's no problem. Go to Favorites-Organise Favorites, and then create the folders you need. You can move items into a folder simply by selecting an item in the list and then clicking on Move to Folder and then selecting the appropriate folder. Easy!

Still on the subject of Favorites, what tends to happen as you add new ones is that they just get added to the bottom of the list. You can sort them alphabetically though: click on Favorites, and then right-click anywhere in the list and then click on Sort by Name.

History in the making

You know you came across an excellent website some time ago, but for some reason best known to yourself you didn't bother to bookmark it - that is, add it to your Favorites list - at the time? No problem. The first thing you can do is look at the History log. Press Ctrl-H, and you'll see a list organised by time periods, i.e. by the days of this week, or one week ago, two weeks ago and so on. But what if you can't remember when you visited the website?

All is not lost! At the top of the History section you'll notice two menu headings, View and Search. Click on View, and you will notice that you can sort the list by Date, Site, Most Visited and Order Visited Today. So, for instance, if you can remember the name of the website you can sort the list by name, i.e. alphabetically, and take it from there.

If even those sorting options are not really of much help, the next option is to do a search. This works in a similar way to the simple search facility in Google and other internet search engines, except that it will only search your own history log, not the internet itself. So, click on Search, and then type something in, and you will get a list, hopefully, of relevant sites.

Just one word of warning: if Internet Explorer is set up to clear the history log every 20 days, and you last visited the site you're looking for twenty one days ago, I am afraid that you are going to be unlucky. But that brings us to our next tip...

Property dealing

You can set all sorts of defaults in Internet Explorer, including how often the history log is cleared. You change this and other properties by selecting Tools-Internet Options. Do that now, and you'll see that the first "page" of this dialog box, the General section, lets you decide what your home or start page is going to be. You see, you don't have to have Microsoft's main page as your starting point! Many people choose Google or another search engine as their home page. Personally, I set my own website as my home page. What you choose is, of course, up to you, but it's a good idea to select a website that you visit frequently, or which gives you a nice ripple of contentment each time you see it.

FIVE TIPS FOR INTERNET EXPLORER - CONTINUED

Part of this same section is concerned with the history log. The default length of time that web pages are kept in the history is twenty days. However, you can set this for any number of days between 1 and 99. You can also clear the history at any time by clicking on, er, Clear History. (However, this isn't a brilliant privacy option to be honest as Windows stores details of every site you visit in hidden files, apparently. To clear that record, you would need to buy a 3rd party product.)

Searching, searching....

We've mentioned Google a couple of times, so it's worth pointing out that if you do quite a bit of searching it makes sense to have Google, or other search engines, there at your fingertips. Being an avid surfer, I have two search engines at my fingertips, which is probably a bit excessive! The main one I use is Google, but I also use Dogpile, more of which in a moment.

To have Google on the Internet Explorer toolbar, go to <http://www.google.com>, and then click on Services and Tools. Then click on either Google browser buttons or the Google toolbar link, and take it from there. (*Editor: Copernic@copernic.com does the same thing.*)

Dogpile is a great utility because what it does is trawl through a number of search engines, so you obtain a much wider coverage. It means, in essence, that even if, say, Google was to come up with nothing, it's just possible that a different search engine could be more successful. What Dogpile does is save you the bother of having to find these search engines and then type (or copy/paste) the search term in all over again. To use this facility, go to <http://www.dogpile.com> and then click on the link labelled Download the toolbar.

Once you have installed either of these toolbars, you get pretty much the full range of options that you would enjoy if you were to go to the Google or Dogpile home page, but without leaving the comfort of your own home page or the site you happen to be visiting right now. These options are in the drop-down menus and icons on the two toolbars. If, though, you feel a burning need to go to the Google or Dogpile home page, simply click on the word Google or Dogpile in the respective toolbars, and one of the options in each case will be the home page.

Applying yourself

Finally, you have the option of setting up Internet Explorer to co-operate with certain other types of application. One of the features in Internet Explorer, just to take one example, is the facility to email a page or a link to a page. Well, you can specify which email program is used as the default one.

Go to Tools-Internet Preferences again, but this time select the Programs tab. Not surprisingly, the defaults already set are all Microsoft products, like Outlook or Outlook Express. However, Internet Explorer is pretty clever: click on the drop-down menu next to each program and you'll be impressed (or at least I was) by the fact that Internet Explorer "knows" what other relevant programs have been installed on your computer.

So in my case, for example, I was able to very quickly reset my email program to Eudora, and my newsgroups program to Forte Agent. In a similar way, you can set the default program for the HTML editor, internet calling (ie talking to people over the internet) and your contacts list. Not exactly rocket science, but it all helps!

READERS!!

Where are your contributions?

Surely there is a member who could fill this small space!

THE STORY OF FISKVILLE - CONT

Ian McLean VK3JQ

Cont from Feb 2004 issue

Beam Wireless comes to Australia.

Following his successful trials with shortwave radio, Marconi proposed to Commonwealth governments that he provide an Empire wireless service using direct shortwave links. He promised that such a service would operate at 1/50th of the power, three times the speed, and 1/20th the cost of any system currently in operation or under construction.

The Governments of South Africa, Canada and Australia immediately approved the scheme, and the Australian Government signed a new contract with AWA in which the company would manage the construction and operation of "a station in Australia which would effect direct wireless communication with Britain and Canada".

AWA accepted a tender from the Marconi Company to erect two receiving stations and two transmitting stations in Australia; both would communicate with Britain and Canada. The cost, £119,000, was substantially less than the £500,000 that would have been required to build a long-wave radio station.

Under the terms of this agreement, the Marconi Company was to demonstrate that the completed stations could send and receive messages accurately at the rate of 100 five letter words per minute over a period of seven hours per day (a duplex capacity of 21,600 words per day). The Marconi Company guaranteed that the new stations would be able to handle double this amount.

In order to select suitable sites for these stations, transmission and reception tests were made at several locations to determine local atmospheric and other conditions.

Considerable investigation was made in order to determine the wavelengths most suitable for giving reliable communication over the longest daily period, and tests demonstrated that a wavelength in the vicinity of 25 metres would be the most desirable.

A 154 hectare site for the transmitting station was chosen at Ballan and a site for the receiving stations was found at Rockbank. Both sites were close to Melbourne to allow easy management.

The stations communicating with England were capable

of transmitting and receiving messages from both directions around the globe, which meant that almost continuous communication could be carried out both day and night.

It was planned that both the receiving and transmitting stations would be controlled from AWA's central office in Melbourne by landline. Messages would be relayed to other capital cities via landline or via feeder stations such as that at Pennant Hills, which was connected to the Sydney Office by landline.

The Australia-Britain Beam Wireless Service to England was opened on 8th of April, 1927, and the service to Canada some 15 months later. The transmitting beam station was erected at Ballan, some sixty miles from Melbourne, and a site twenty miles from Melbourne, at Rockbank, was selected for the receivers, the stations being connected by landline to a central office in Melbourne, where the actual transmission and reception is effected. Ballan station was engined by three 150 h.p. Diesels, and both stations were complete with staff buildings consisting of bachelor quarters, cottages, and recreation rooms.

A school for the education of the children was erected in the transmitter grounds at what was to become Fiskville.

On September 5th, 1927, Ernest Fisk transmitted the first Empire radio broadcast from Sydney to London. On October 31st the following year, he conducted public demonstrations of two-way telephone links with America. Within two years, Australia and Great Britain were linked by a public radio-telephone service and in 1934, the photo-telegraph service was introduced on the Australia-Great Britain beam circuit.

During the 1940s - a turbulent period which included the Second World War - several conferences were held in England to discuss "Empire" communications. A 1945 conference recommended public ownership of all such services and at the end of that year these recommendations were accepted by the Australian Government, leading to an act, in 1946, to establish the Overseas Telecommunications Commission.

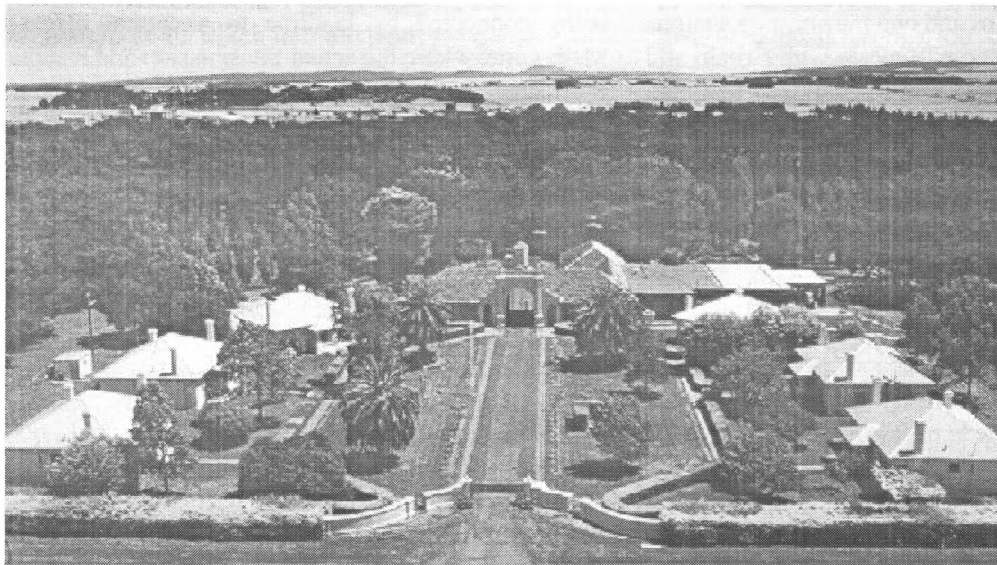
This was a fundamental change in Australia's communication services, from private enterprise to

THE STORY OF FISKVILLE - CONT

government authority, and was a major change for AWA and its engineers and the support staff involved in the Beam Service. AWA carried out some hard bargaining for those staff transferred to the new Commission, to make sure they were not affected unfavourably in matters such as pensions, superannuation, long service leave and other rights.

The Beam Wireless Stations: Ballan (Fiskville)

Under a "Care and management" agreement between AWA and OTC, the company continued to operate the service until January 31st, 1947, and OTC commenced its operation on February 1st that year. The final transfer was carried out smoothly. In a letter to AWA's Managing Director, Lionel Hooke, the chairman of OTC Mr J Malone, expressed the gratitude of the Commission for the company's splendid co-operation and his confidence in continuing good relations in the future.



Fiskville

Staff quarters were completed at the Ballan site in 1927, and comprised eleven cottages for married staff and a substantial building to be used for bachelors' quarters. All cottages were supplied with electricity and hot and cold running water. Although, initially, conditions were not ideal, with flooding rains and snow, followed by drought, the community flourished. The roads were soon improved, most families owned a car, and telephones and radiola 'supers' lessened the isolation.

AWA built a recreation hall and purchased a pianola for its employees. In their leisure time, staff and their

families played tennis or golf; some took up hunting. The Ballan Social Committee organised regular picnics, which were sometimes attended by Beam staff from Melbourne or Rockbank.

In 1933, the name of the Ballan site was changed to Fiskville, in honour of its founding father Sir Ernest Fisk, and the small community opened its own school, built to take 32 pupils. Fiskville now had an identity of its own.

The transmitting station itself included a powerhouse, which was equipped with three large crude oil engines, each having three cylinders, which drove an electric generator. The power from these generators was taken to a switchboard, which operated other machines.

The transmitter produced RF at a frequency of 11.6 MHz, which was fed to the aerials. The plate circuits of

the transmitter required 10,000 volts to operate them, produced by stepping up the voltage through a transformer to a rectifier bank consisting of sixteen valves, each about the size of a football, mounted on slabs of glass on a rack.

The Rockbank Receiving station.

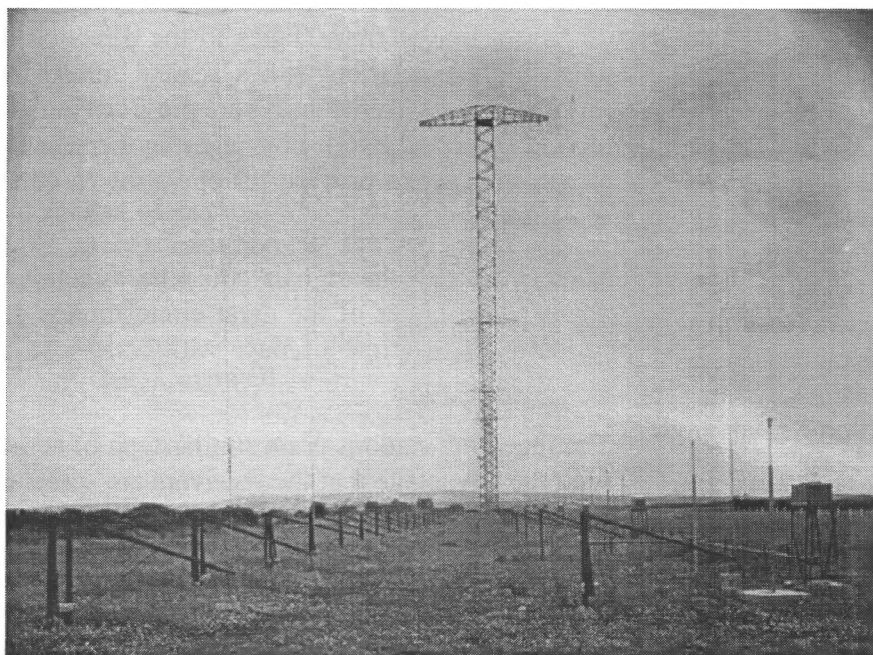
The receiving station building at Rockbank, 24 kilometres north-west

of Melbourne, was much smaller than the transmitting building at Ballan, mostly due to the fact that the enormous power needed to run the transmitters at Ballan was not required.

One staff member wrote: 'Here there is no bluster of shrilling machines as at Ballan, no noisy powerhouse, no atmosphere of unleashed, untold energy. Here is a purposeful silence, a sense of listening; even the building crouching at the feet of the mighty aerial masts seems to be huddling there with its finger on its lips. For Rockbank is gathering in the power generated in another hemisphere; gathering in, on its sensitive antennae, intangible rays which, focused on Australia, are emitted

from an upended framework of inanimate wires on the other side of the world!'.
 Lead in systems from the aerials terminated in a special room housing the receivers which, by 1934, included one each for British traffic, Canadian traffic, the Picturegram Service and a spare.

Looking down the line of the antenna



The signals were picked up, amplified, and passed by landline to the Melbourne or Sydney offices. As the Beam Service expanded, so did the receiving facilities at Rockbank. Between 1935 and 1947, several new arrays of aerials were erected for work with Montreal, Port Moresby, San Francisco and the new relay stations at Perth, Colombo, and Bombay.

Staff housing was completed in 1926, with four cottages for married staff and a large single mens' quarters, all equipped with electricity and running water. In 1935, six additional above ground water tanks were supplied and a petrol pump was installed at the station for staff cars. By the 1950s, Rockbank had become part of Melbourne's suburbia, with land being subdivided and much house building taking place in the area.

As new technology was introduced, Rockbank's role in overseas telecommunications services diminished.

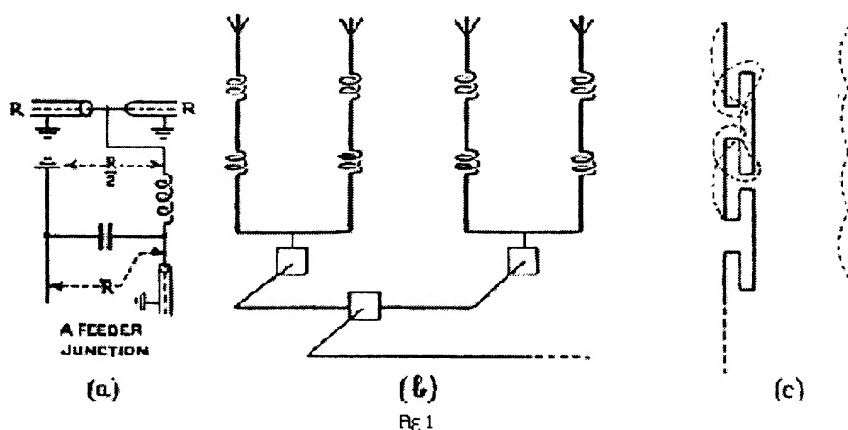
The station finally closed its doors in May 1969.

The Antennas

The system consists of a unidirectional broadside array composed of a line of directly excited Franklin " uniform " aerials, spaced usually a half wave length apart, with another parallel line of reflector aerials situated a quarter wavelength behind, having aerials spaced a quarter wavelength apart. The directly excited " in-phase " aerials are energised in pairs from a branched concentric feeder system, shown diagrammatically in Fig. 1 (a) and (b).

The rows of aerials are several wavelengths in height, and alternate half wavelength suppression is carried out in an improved manner, the older phasing coils having been replaced by a " folded back " aerial. This is shown diagrammatically in Fig. 1 (c),

and represents an approach to the ideal uniform current aerial.



Reflector aerials are usually built up of insulated half wavelength sections.

The system produces a beam inclined upwards at an angle of about 15' to the horizontal, having a divergence of about 11' depending upon the aperture of the array.(Fig 2)

THE STORY OF FISKVILLE - CONT

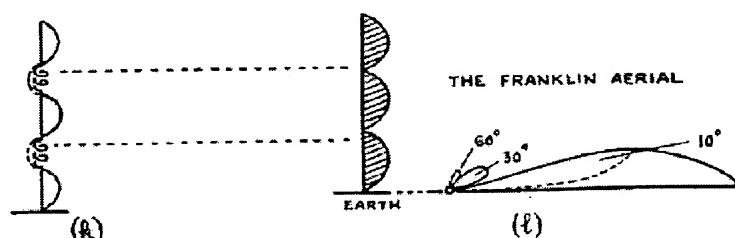


FIG. 2

The use of a multiple feeder system makes it easy to mis-phase the currents supplied to the aerials in line. It is sometimes done by altering the equality of the length of the subsidiary feeder lines. In the Franklin system, correct impedance matching and control of the current phase is simultaneously done by arranging a simple parallel circuit, Fig. 1 (a), at each bifurcation of the feeder. Reference has already been made to the use of this mis-phasing in order to swing the beam through some small angle in case of need.

With a given aerial system, it is possible to cover a frequency band some 15 per cent. in width without serious loss of efficiency. This is due to the high radiation resistance of the array, which, in turn, is partly due to the use of twice as many reflector aerials as energised ones.

Experiments had shown that signals travelled to Australia along one or other of the two great circle paths joining the transmitter and the receiver, the path taken being largely determined by the distribution of daylight and darkness over the two routes. The aerials were therefore made capable of projecting the radiation in both a north-westerly and south-easterly direction.

The original Beam stations at Rockbank and Ballan had some similarities, one of the most distinctive being the masts. Each station had three masts (known as Franklin masts) placed 195 metres apart, standing 75 metres high, made from lattice steel and weighing 50 tons. Each mast supported a crossarm 27 metres in length and was stayed by four wires placed at right angles which were buried in concrete blocks about 33 metres from the base.

The beam aerial consists of an array of insulated vertical aerials suspended from horizontal sup-

ports, known as Triatics, attached to the ends of the cantilever arms, of the 3 masts. Behind the aerials in the centre of the line of masts, are supported a similar structure, which acts as a reflector. In the Anglo-Australian system there are 32 active aerials spaced in a line at right angles to the direction of propagation with a second line of 64

reflector aerials. Aerial arrays are provided in front of, and behind, the reflectors and may be selected at will in order to provide for operation in either direction.

This meant that the signals could be directed or received via either of the great circle routes, depending on the time of day, with little loss of operating time.

The receiving stations use a similar type of aerial, with the advantage that the receivers are screened from radiation emanating from sources outside the area of reception, and this feature greatly reduces, and in many cases eliminates, atmospherics.

This type of aerial can also be utilised for the simultaneous transmission or reception of telephone and telegraph messages without mutual interference, and is also used for facsimile transmission over the beam service.

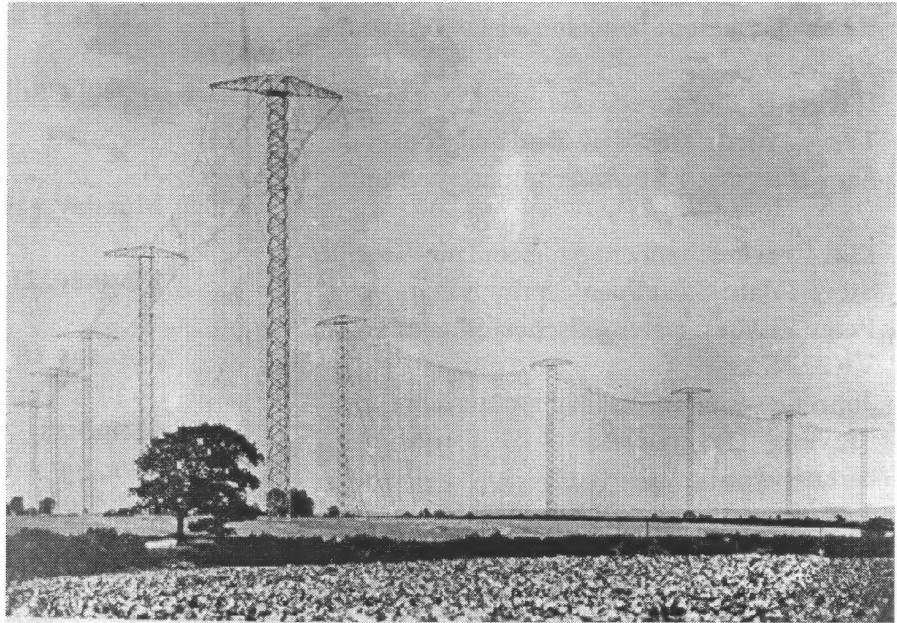
The total power consumed by the beam aerial is 20 kW. The separate aerial wires are connected to the transmitters by concentric copper tube feeders and each aerial is separately fed with the same amount of energy.

Considerable attention has been paid to the maintenance of constant frequencies, and for this purpose, the Franklin drive is used, which is capable of holding the carrier frequency constant irrespective of wide atmospheric and temperature variations and it also incorporates a device which can be made to vary the carrier frequency within controlled limits on either side of the mean frequency. A variation of frequency to a width of 300 cycles on either side is employed, and this "wobbling" has been particularly valuable in the reduction of fading.

At the receiving end fading was further reduced by the spaced aerial method of diversity reception.

Double superheterodyne receivers were employed, signals being amplified on the signal and on two intermediate frequencies. The signals were fed into the city office in Melbourne at radio frequencies where they were converted into direct current signals for the operation of high speed undulators, which had been found to afford the only practical means of coping with the high speeds common in the beam operation.

The Antenna array at Poldhu, Cornwall



To be continued in the next issue

HUMOUR FROM THE INTERNET

These are taken from Cvs and covering letters

1. "I have lurnt Word Perfect 6.0 computer and spreadsheet programs."
2. "Am a perfectionist and rarely if if ever forget details."
3. "Received a plague for Salesperson of the Year."
4. "Wholly responsible for two (2) failed financial institutions."
5. "Reason for leaving last job: maturity leave."
6. "Failed bar exam with relatively high grades."
7. "It's best for employers that I not work with people."
8. "Let's meet, so you can 'ooh' and 'aah' over my experience."
9. "I was working for my mom until she decided to move."
10. "Marital status: single. Unmarried Unengaged. Uninvolved. No commitments."
11. "I have an excellent track record, although I am not a horse."
12. "I am loyal to my employer at all costs. Please feel free to respond to my resume on my office voice ail."
13. "My goal is to be a meteorologist. But since I possess no training in meteorology, I suppose I should try stock brokerage."
14. "I procrastinate, especially when the task is unpleasant."
15. "Personal interests: donating blood. Fourteen gallons so far."
16. "Instrumental in ruining entire operation for a Midwest chain"
17. "Note: Please don't misconstrue my 14 jobs as 'job-hopping'. I have never quit a job."
18. "Marital status: often. Children: various."
19. "The company made me a scapegoat, just like my three previous employers."
20. "Finished eighth in my class of ten."
21. "References: none. I've left a path of destruction behind"

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MEETING SCHEDULE FOR ACCA

VENUE FOR MEETINGS.

Kirribilli Club, Cliff Street, Milsons Point,
7.30pm

Monday, 17 May

Monday, 21 June

Monday 18 July

Members can meet before the main
discussion for a meal 6.30pm. The meeting will
start at 7.30pm.

**What are your suggestions for
meeting places?**

**What are your suggestion for
interesting speakers?**

Contact via email or ring Peter on 02 9960 1486
or Warren on 02 4362 2316

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